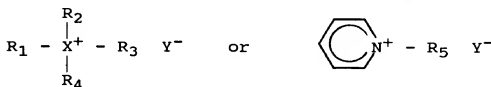


path of said tube and is visible when said endotracheal tube is inserted, said detector comprising a backing and an indicator material, said indicator material comprising a support material, a pH-sensitive dye, and a phase transport enhancer for enhancing a reaction between ~~a gas such as CO₂~~ ^{H₂CO₃} and said pH-sensitive dye, said phase transport enhancer having the formula:



PS wherein X = N or P,

P1 R₁, R₂, R₃ and R₄ are selected from the group consisting of C₁-C₁₂ alkyl,

P2 14 C₁-C₄ substituted alkyl wherein the substituent is a C₁-C₄ alkyl or phenyl group,

P2 naphthyl,
benzyl, and
pyridine;

P1 R₅ is selected from the group consisting of C₁-C₁₂ alkyl and benzyl; and 14

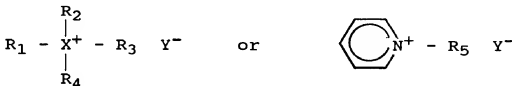
P1 31 Y⁻ is an anion selected from the group consisting of hydroxide, fluoride, chloride, bromide, iodide, carbonate and tetrafluoroborate.

2. Apparatus as recited in claim 1, wherein said phase transport enhancer is selected from the group consisting of tetrabutylammonium hydroxide, tetrabutylammonium chloride, tetraethylammonium bromide, tetraethyl-

ammonium p-toluenesulphonate, phenyltrimethylammonium chloride, benzyltrimethyl-ammonium bromide, tetra-n-propyl-ammonium bromide, benzyltriethylammonium tetrafluoroborate, n-dodecyltrimethylammonium bromide, tetraphenylphosphonium chloride, n-hexadecylpyridinium bromide and triphenylmethyl-triphenylphosphonium chloride.

58. ³ A tracheal intubation apparatus, comprising:

P1 means for receiving gas expired from a person; and a detector disposed within said means for visually indicating whether a substantial concentration of CO₂ is present in said gas, wherein said detector comprises indicator material which changes from one color in the presence of CO₂, and changes to another color in response to an absence of CO₂, said indicator material comprising a support material, a pH-sensitive dye, and phase transport enhancer for enhancing a reaction between ^{H₂CO₃} ~~a gas such as CO₂~~ and said pH-sensitive dye, said phase transport enhancer having the formula:



P5 wherein _LX = N or P,

P1 R₁, R₂, R₃ and R₄ are selected from the group consisting of C₁-C₁₂ alkyl,

P2 14 C₁-C₄ substituted alkyl wherein the substituent is 14 a C₁-C₄ alkyl or phenyl group,

naphthyl,

45

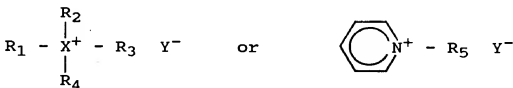
P2 benzyl, and
L pyridine;

P1 R5 is C₁-C₁₂ alkyl or benzyl; and

L Y⁻ is an anion selected from the group consisting of hydroxide, fluoride, chloride, bromide, iodide, carbonate and tetrafluoroborate.

4 55. A tracheal intubation apparatus, comprising:

P1 means for receiving gas expired from a person; and
L a detector disposed within said means for visually indicating whether a substantial concentration of CO₂ is present in said gas; wherein said detector comprises a phase transport enhancer and a dye solution applied to a support material, said phase transport enhancer enhancing a reaction between a ~~gas such as CO₂~~ ^{H₂CO₃} and said dye solution, said phase transport enhancer having the formula:



PS wherein X = N or P,

P1 R₁, R₂, R₃ and R₄ are selected from the group consisting of C₁-C₁₂ alkyl,

P2 C₁-C₄ substituted alkyl wherein the substituent is

14 a C₁-C₄ alkyl or phenyl group,

P2 naphthyl,
L benzyl, and
L pyridine;

46

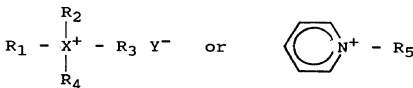
P1 R₅ is C₁-C₁₂ alkyl or benzyl; and

P1 Y⁻ is an anion selected from the group consisting of hydroxide, fluoride, chloride, bromide, iodide, carbonate and tetrafluoroborate.

~~60.~~ A breath indicator comprising:

5 P1 a. means for receiving CO₂;

L b. a detector disposed within said means for receiving CO₂, said detector comprising means for changing between a first color and a second color, said first color indicating an absence of CO₂ and said second color indicating a presence of CO₂, said means for changing between a first color and a second color comprising indicator material, said indicator material further comprising a dye and a phase transport enhancer for enhancing a reaction between ^{HCO₃⁻} ~~a gas~~ ⁴²⁰⁰³ such as CO₂ and said dye, said phase transport enhancer having the formula:



PS

P1 wherein LX = N or P,

P1 R₁, R₂, R₃ and R₄ are selected from the group consisting of C₁-C₁₂ alkyl,

P2 14 C₁-C₄ substituted alkyl wherein the substituent is

19a C₁-C₄ alkyl or phenyl group,

P2 naphthyl,

L benzyl, and

P2 pyridine;

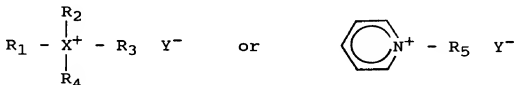
P1 R₅ is C₁-C₁₂ alkyl or benzyl; and

P1 Y⁻ is an anion selected from the group consisting of hydroxide, fluoride, chloride, bromide, iodide, carbonate and tetrafluoroborate.

C1
cont
6 ~~61~~ A breath indicator comprising:

P1 a. means for receiving CO₂;

1 b. a detector disposed within said means for receiving CO₂, said detector comprising means for changing between a first color and a second color, said first color indicating an absence of CO₂ and said second color indicating a presence of CO₂, said means for changing between a first color and a second color comprising indicator material, said indicator material comprising a support material, a pH-sensitive dye applied to said support material, and a phase transport enhancer for enhancing a reaction between ^{H2CO3} ~~a gas~~ ~~such as CO₂~~ and said pH-sensitive dye, said phase transport enhancer having the formula:



P3 wherein X = N or P,

P1 R₁, R₂, R₃ and R₄ are selected from the group consisting of C₁-C₁₂ alkyl,

P2 14 C₁-C₄ substituted alkyl wherein the substituent is 14 a C₁-C₄ alkyl or phenyl group,

P2 naphthyl,
| benzyl, and
| pyridine;

P1 R₅ is C₁-C₁₂ alkyl or benzyl; and

C1
cont
L Y⁻ is an anion selected from the group consisting of
31 hydroxide, fluoride, chloride, bromide, iodide, carbonate and
tetrafluoroborate.

7
62. A method for determining the proper placement of an
endotracheal intubation device comprising the steps of

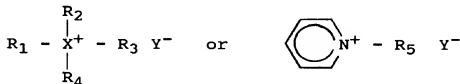
P1 (1) inserting a device into the trachea of a
patient, said ^{method} device comprising ^{do steps in providing:}

P2 (a) an endotracheal apparatus which includes
a tracheal tube defining a gas path; and

P2 (b) a CO₂ detector disposed within said
endotracheal apparatus at a location
which is in the gas path of said tube and
is visible when said endotracheal tube is
inserted, said detector being capable of
indicating whether a substantial
concentration of CO₂ is present in said
gas, said CO₂ detector comprising a
backing, and an indicator material, said
indicator material comprising a solid
phase support, a pH-sensitive dye, and a
phase transport enhancer for enhancing a
reaction between ^{H₂CO₃⁴⁻³} ~~a gas such as CO₂~~ and

said pH-sensitive dye, said phase transport enhancer having the formula:

T 500X



wherein $X = N \text{ or } P$,

R_1, R_2, R_3 and R_4 are selected from the group consisting of C_1 - C_{12} alkyl,

C_1 - C_4 substituted alkyl wherein the substituent is a C_1 - C_4 alkyl or phenyl group,

naphthyl,
benzyl, and
pyridine;

R_5 is selected from the group consisting of C_1 - C_{12} alkyl or benzyl; and

Y^- is an anion selected from the group consisting of hydroxide, fluoride, chloride, bromide, iodide, carbonate and tetrafluoroborate; and

(2) observing a color change of the indicator which indicates the presence of CO_2 in the respiratory gas and thereby the proper placement of the endotracheal tube.

The method of claim 1, wherein said phase transport enhancer is selected from the group consisting of tetrabutylammonium hydroxide, tetrabutylammonium chloride, tetraethylammonium bromide, tetraethylammonium p-toluene-sulphonate, phenyltrimethylammonium chloride, benzyl-

CF
CWT

trimethylammonium bromide, tetra-n-propylammonium bromide, benzyltriethylammonium tetrafluoroborate, n-dodecyltrimethylammonium bromide, tetraphenylphosphonium chloride, n-hexadecylpyridinium bromide and triphenylmethyltriphenylphosphonium chloride. —

Please cancel claims 48-55 without prejudice or disclaimer to the subject matter therein.

REMARKS

Applicants wish to thank the Examiner for the helpful and courteous telephone interview held with the undersigned and David K.S. Cornwell, Reg. No. 31,944 on April 24, 1990. The issues in the case were discussed.

New claims 56-63 correspond to old claims 48-55 except for correction by addition of the heterocyclic ring of the phase transport enhancer depicted in the claims and except for insertion of the definition of the phase transport enhancer in new claims 59 and 61. No new matter was added by way of these amendments. Reconsideration of claims 56-63 in light of the following remarks is respectfully requested.

THE REJECTIONS UNDER 35 U.S.C. § 103 MAY BE PROPERLY WITHDRAWN

Claims 51 and 53 are rejected under 35 U.S.C. § 103 as being unpatentable over Fehder in view of Heitzmann. The Examiner states that Fehder discloses a tracheal intubation apparatus comprising a detector for carbon dioxide. The